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03/07/01

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Below is a communication from the EXAMINER in charge of this application

COMMISSIONER OF PATENTS AND TRADEMARKS

ADVISORY ACTION

☒ THE PERIOD FOR RESPONSE:

- a) ☒ is extended to run \_\_\_\_\_ or continues to run three months from the date of the final rejection
- b) ☐ expires three months from the date of the final rejection or as of the mailing date of this Advisory Action, whichever is later. In no event however, will the statutory period for the response expire later than six months from the date of the final rejection.

Any extension of time must be obtained by filing a petition under 37 CFR 1.136(a), the proposed response and the appropriate fee. The date on which the response, the petition, and the fee have been filed is the date of the response and also the date for the purposes of determining the period of extension and the corresponding amount of the fee. Any extension fee pursuant to 37 CFR 1.17 will be calculated from the date of the originally set shortened statutory period for response or as set forth in b) above.

- ☐ Appellant's Brief is due in accordance with 37 CFR 1.192(a).

- ☒ Applicant's response to the final rejection, filed 11-6-00 has been considered with the following effect, but it is not deemed to place the application in condition for allowance:

- 1: ☐ The proposed amendments to the claim and/or specification will not be entered and the final rejection stands because:
- a. ☐ There is no convincing showing under 37 CFR 1.116(b) why the proposed amendment is necessary and was not earlier presented.
- b. ☐ They raise new issues that would require further consideration and/or search. (See Note).
- c. ☐ They raise the issue of new matter. (See Note).
- d. ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal.
- e. ☐ They present additional claims without cancelling a corresponding number of finally rejected claims.

NOTE:

2. ☐ Newly proposed or amended claims \_\_\_\_\_ would be allowed if submitted in a separately filed amendment cancelling the non-allowable claims.
3. ☒ Upon the filing an appeal, the proposed amendment ☒ will be entered ☐ will not be entered and the status of the claims will be as follows:

Claims allowed: NONE

Claims objected to: NONE

Claims rejected: 1, 3, 5, 7-12

However;

- ☐ Applicant's response has overcome the following rejection(s): \_\_\_\_\_

4. ☒ The affidavit, exhibit or request for reconsideration has been considered but does not overcome the rejection because The claimed structure is unpatentable over Summefeld, Kawakubo, for the reasons in record paper number 15.
5. ☐ The affidavit or exhibit will not be considered because applicant has not shown good and sufficient reasons why it was not earlier presented.

☐ The proposed drawing correction ☐ has ☐ has not been approved by the examiner.

☐ Other

TOM THOMAS  
SUPERVISORY PATENT EXAMINER

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## DETAILED ACTION

### *Claim Rejections - 35 U.S.C. § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, and 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Summerfelt et al. (US 5,566,045).

Regarding claims 1, 7, 8, 9, Summerfelt et al. discloses a capacitor structure in an integrated semiconductor device comprising: a semiconductor substrate (30); a first electrode (34, a platinum group materials. See Summerfelt et al.'s col.10) connected to a doped region (44), capacitor dielectric layer (38, a BST layer with a dielectric constant greater than 100. See Summerfelt et al.'s col.11) formed on the first electrode; a barrier layer (52, a GaAs layer. See Summerfelt et al.'s col.13) which is a compound of a transition element (Ga) and As formed below the capacitor dielectric layer; a second electrode formed on the capacitor dielectric layer. See Summerfelt et al.'s Fig.12.

Claims 1, 3-5, and 7-12 are rejected under 35 U.S.C. 102(a) as being anticipated by Kawakubo et al. (US 5,691,219).

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Regarding claims 1, 3, 7, 8, 9, 10, 11, Kawakubo et al. discloses a capacitor structure in an integrated semiconductor device comprising: a semiconductor substrate (1) having a doped region (6b) therein; a first electrode (13, a platinum alloy) connected to the doped region through a connection structure (11, a phosphorus-doped polysilicon layer. See Kawakubo et al.'s col.7 lines 39-43); a capacitor dielectric layer (14, a BST layer with a dielectric constant greater than 100. See Kawakubo et al.'s col.8 lines 5-8) formed on the first electrode; a barrier layer (12, a layer of transition metal such as Ti or Ta. See Kawakubo et al.'s col.7 lines 55-60 ) formed below the capacitor dielectric layer; a second electrode (14) formed on the capacitor dielectric layer. See Kawakubo et al.'s Fig.4E.

Kawakubo et al. does not explicitly teach that the barrier is a compound of a transition element and phosphorus as the barrier; however, this barrier layer is taken to be inherently present in Kawakubo et al. for the following reasons: the transition element layer (12, a layer of Ti or Ta) will react with phosphorus from the connection structure (11, a polysilicon layer containing phosphorous) inherently forming a barrier material such as a TiP or TaP. Noted that, US60115997 patent clearly teaches that 'certain Group VB nonmetal elements such as: N, P, As, and Sb, can react with titanium to form barrier materials (e.g., TiN, TiP, TiAs, and TiSb)' provides proof for Ti or Ta will react with phosphorus in polysilicon to form TiP or TaP barrier layer in Kawakubo et al. See US6011997's col.7 lines 50-60.

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Regarding claims 4-5, as shown in Fig.4E, the barrier layer is disposed directly underneath the first electrode, covers entire an interface between the first electrode and the connection structure and covers entire an interface between the first electrode and the capacitor dielectric.

Regarding claim 12, Kawakubo et al. teaches that the capacitor connected to a selection transistor through the doped region (6b). See Fig.4E.

### ***Response to Arguments***

2. Applicants argue that gallium is not a transitional element. In response, the evidence that Ga is a transition element was already provided to Applicant in the final office action filed on 11-06-00. US patents US705685, US5990348, US6043184, and US6060419, presented as the evidence, clearly teach that gallium is a transitional element.

Applicants argue that the concentration of phosphorous atoms used as a dopant for a plug is far too low to create a TiP barrier layer. In response, the arguments of counsel cannot take the place of evidence in the record. In re Schulze, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965); In re Geisler, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997) ("An assertion of what seems to follow from common experience is just attorney argument and not the kind of actual evidence that is required to rebut a prima facie case of obviousness."). See MPEP 716.01(c) for examoples of attorney

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statements which are not evidence and which must be supported by an appropriate affidavit or declaration.

***Conclusion***

**3. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

**4. Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.**

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5. Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to CUONG Q NGUYEN whose telephone number is (703) 308-1293. The Examiner is in the Office generally between the hours of 6:30 AM to 5:00 PM (Eastern Standard Time) Monday through Thursday.

6. Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center Receptionists whose telephone number is 308-0956.

Cuong Nguyen

December 2, 2002